

Amendments to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in this application.

Listing of Claims:

52. (Currently Amended) A connector for electrically connecting to pads formed on a semiconductor device, comprising:

a substrate;

a plurality of electrically conductive contact elements formed on the substrate, said contact elements projecting away from the substrate; and

an electrical circuit ~~formed on or~~ embedded within the substrate, the electrical circuit being electrically connected to at least one of the plurality of contact elements,

a surface of the substrate exposing an exposed portion of the embedded electrical circuit,
a contact element of the plurality of electrically contact elements formed on and electrically
connected to the exposed portion by metal plating.

53. (Currently Amended) The contact elements of claim 52 separated by a pitch of less than ~~about~~ 250 microns.

54. (Previously Presented) The contact elements of claim 52 having curvature.

55. (Previously Presented) The contact elements of claim 54 having a wiping surface that is up to approximately 50% of a second surface to which it is wiped.

56. (Previously Presented) The contact elements of claim 52 in vertical alignment with respective pads of the semiconductor device.

57. (Previously Presented) The contact elements of claim 52 coated with a conductive material.

58. (Previously Presented) The contact elements of claim 52 made from a material selected from the group of copper, copper alloy, small-grained copper-beryllium (CuBe) alloy, and a stainless steel/Cu/Ni/Au multilayer.

59. (Currently Amended) The connector of claim 52, the plurality of electrically conductive contact elements connected ~~disposed to connect~~ to solder balls formed on the semiconductor device, the which solder balls are formed having a pitch of less than ~~or about~~ 250 microns.

60. (Previously Presented) The contact elements of claim 59 having a plane of contact tangent to a side surface of the solder balls.

61. (Previously Presented) The contact elements of claim 52 having two or more curved portions.

62. (Previously Presented) The contact elements of claim 52 being of at least two types, a first type having a mechanical property different from a mechanical property of a second type.

63. (Previously Presented) The contact elements of claim 52 being of at least two types, a first type projecting away a first distance above a top surface of the substrate and a second type projecting a second distance above the top surface of the substrate, the second distance being greater than the first distance.

64. (Previously Presented) The contact elements of claim 52 being of at least two types, a first type being made of a first metal composition and a second type being made of second metal composition different from the first metal composition.

65. (Previously Presented) The contact elements of claim 52 being of at least two types, a first type being separated by a first pitch and a second type being separated by a second pitch larger than the first pitch.

66. (Canceled)

67. (Canceled)

68. (Previously Presented) The contact elements and portions of the electrical circuit of claim 52 formed using a metal layer of the same type.

69-72. (Canceled)

73. (Currently Amended) The at least one electrical ~~circuit~~ device of claim 52 comprising at least one of an interconnected metal layer, a capacitor, and an inductor.

74. (Currently Amended) A connector for electrically connecting to solder balls of a ball grid array device, comprising:

a substrate;

a plurality of electrically conductive contact elements formed on the substrate, said contact elements projecting away from the substrate; and

an electrical circuit ~~formed on or embedded~~ within the substrate, the electrical circuit being electrically connected to at least one of the plurality of contact elements,

a surface of the substrate exposing an exposed portion of the embedded electrical circuit,
a contact element of the plurality of electrically contact elements formed on and electrically
connected to the exposed portion by metal plating.

75. (Previously Presented) A plane of contact of the contact elements of claim 74 being a plane tangent to a side surface of the solder balls being contacted.

76. (Previously Presented) A base portion and an extending portion of the contact elements of claim 74 are a contiguous structure made from the same conductive material.

77. (Previously Presented) A base portion and an extending portion of the contact elements of claim 74 are formed using a first conductive metal and a second conductive metal, respectively, the first and second conductive metals being different from each other.

78. (Previously Presented) The contact elements of claim 74 are made from a material selected from the group of copper, copper alloy, small-grained copper-beryllium (CuBe) alloy, and a stainless steel/Cu/Ni/Au multilayer.

79. (Previously Presented) The electrical circuit of claim 74 formed by one or more metal layers embedded within the substrate.

80. (Previously Presented) The contact elements and at least portions of the electrical circuit of claim 74 being formed of a metal of the same type.

81. (Currently Amended) The at least one electrical ~~circuit~~ device of claim 74 comprising at least one of an interconnected metal layer, a capacitor, and an inductor.

82. (New) The connector of claim 52, the metal plating providing an integral construction between the contact element and the exposed portion such that a continuous electrical path is formed between the contact element and the electrical circuit, without metal discontinuity and impedance mismatch.

83. (New) The connector of claim 52, the contact element comprising a first contact element,

the surface of the substrate exposing a second exposed portion of the embedded electrical circuit,

a second contact element of the plurality of conductive contact elements formed on and electrically connected to the second exposed portion by metal plating,

the first contact element and the second contact element disposed on the same side of the substrate, and

the first contact element, the electrical circuit, and the second contact element being contiguous such that a continuous electrical path is formed between the first contact element and the second contact element, without metal discontinuity and impedance mismatch.

84. (New) The connector of claim 83, a third contact element of the plurality of conductive contact elements formed on the same side of the substrate as the first contact element and the second contact element, the third contact element being electrically isolated from the first contact element, the second contact element, and the electrical circuit.

85. (New) The connector of claim 52, the electrical circuit being completely embedded within the substrate except for the exposed portion.

86. (New) The connector of claim 52, the electrical circuit including a capacitor embedded within the substrate.

87. (New) The connector of claim 52, the electrical circuit including an inductor embedded within the substrate.

88. (New) The connector of claim 74, the metal plating providing an integral construction between the contact element and the exposed portion such that a continuous electrical path is formed between the contact element and the electrical circuit, without metal discontinuity and impedance mismatch.

89. (New) The connector of claim 74, the contact element comprising a first contact element,

the surface of the substrate exposing a second exposed portion of the embedded electrical circuit,

a second contact element of the plurality of conductive contact elements formed on and electrically connected to the second exposed portion by metal plating,

the first contact element and the second contact element disposed on the same side of the substrate, and

the first contact element, the electrical circuit, and the second contact element being contiguous such that a continuous electrical path is formed between the first contact element and the second contact element, without metal discontinuity and impedance mismatch.

90. (New) The connector of claim 89, a third contact element of the plurality of conductive contact elements formed on the same side of the substrate as the first contact element and the second contact element, the third contact element being electrically isolated from the first contact element, the second contact element, and the electrical circuit.

91. (New) The connector of claim 74, the electrical circuit being completely embedded within the substrate except for the exposed portion.

92. (New) The connector of claim 74, the electrical circuit including a capacitor embedded within the substrate.

93. (New) The connector of claim 74, the electrical circuit including an inductor embedded within the substrate.